

KALMIA ERICOIDES REVISITED.

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ABSTRACT

Specific limits within the Cuban taxa of *Kalmia* (Ericaceae) are reinvestigated. A single species, *K. ericoides*, with two geographically isolated varieties is recognized. *Kalmia ericoides* var. *ericoides* is limited to Pinar del Río while var. *aggregata* occurs only on the Isle of Pines. The taxa may be readily separated by the indumentum of their young twigs. *Kalmia simulata* is placed in synonymy under var. *aggregata*.

The delimitation of species within the *Kalmia* populations of western Cuba (prov. Pinar del Río) and the Isle of Pines has varied widely (Table 1). Some botanists, e.g., Wood (1961) and Ebinger (1974) have considered all the Cuban *Kalmias* as members of a single species, *Kalmia ericoides* (with or without recognized varieties), while others, e.g., Roig & Acuña (1957), Alain (1946 & specimen identifications), and Southall and Hardin (1974) have divided the group into three species, i.e., *K. ericoides*, *K. aggregata*, and *K. simulata*, based upon variation in pubescence (see Figure 1), compactness of the inflorescence, and length of the leaves and/or calyx lobes. Small (1914) recognized only two species, however: at that time *K. simulata* had not been described (see Britton, 1920). Disagreements have also existed as to the geographic distribution of the various recognized taxa (Table 1) and the value of the various characters used in their identification. Therefore the taxonomic relationships between the diverse Cuban populations of *Kalmia* are reassessed here through a detailed study of herbarium materials.

Kalmia ericoides sensu stricto has usually been characterized by the pilose (i.e., with long-celled hairs) and stipitate-glandular pubescence of its leaves and stems. However, the leaves are frequently described as being smooth above (Small, 1914; Roig & Acuña, 1957). Other distinguishing characters are the lax inflorescence (Small, 1914; Roig & Acuña, 1957; Southall & Hardin, 1974; Ebinger, 1974), ciliate calyx lobes (Roig & Acuña, 1957), and pubescent filaments (Small, 1914). *Kalmia aggregata*, described by Small in 1914, is usually distinguished by the densely puberulent and stipitate-glandular pubescence of its leaves and stems, "crowded" leaves (Ebinger, 1974), \pm compact inflorescence (Small, 1914; Jennings, 1917; Roig & Acuña, 1957; Southall & Hardin, 1974; Ebinger,

Table 1. Comparative treatment of Cuban taxa of *Kalmia* by various botanists. (PR = Pinar del Río; IP = Isle of Pines.)

botanist	"ericoides" variant	"simulata" variant	"aggregata" variant
Small (1914)	<i>K. ericoides</i> PR	—	<i>K. aggregata</i> IP
Jennings (1917)	<i>K. ericoides</i> PR	—	<i>K. aggregata</i> IP
Roig & Acuña (1957)	<i>K. ericoides</i> PR, IP	<i>K. simulata</i> IP	<i>K. aggregata</i> IP
Wood (1961)	<i>K. ericoides</i> (geographical distribution of variants not discussed)	<i>K. ericoides</i>	<i>K. ericoides</i>
Southall & Hardin (1974)	<i>K. ericoides</i> PR, IP	<i>K. simulata</i> IP	<i>K. aggregata</i> PR, IP
Ebinger (1974)	<i>K. ericoides</i> var. <i>ericoides</i> PR	<i>K. ericoides</i> var. <i>ericoides</i> IP	<i>K. ericoides</i> var. <i>aggregata</i> IP
this study	<i>K. ericoides</i> var. <i>ericoides</i> PR	<i>K. ericoides</i> var. <i>aggregata</i> IP	<i>K. ericoides</i> var. <i>aggregata</i> IP

1974), and elongate calyx lobes (Southall & Hardin, 1974). Small (1914) considered the filaments to be glabrous, but Jennings (1917) correctly pointed out that the filaments of this taxon are slightly pubescent near the base, as are those of *K. ericoides*. This species is often stated to have larger leaves than either *K. ericoides* or *K. simulata* (see Small, 1914; Ebinger, 1974). Finally, *K. simulata*, a species described by Britton and Wilson (Britton, 1920), is typically characterized as having nearly glabrous to sparsely stipitate-glandular leaves but puberulent stems. Additional characters include the lax inflorescence (Britton, 1920; Roig & Acuña, 1957; Southall & Hardin, 1974; Ebinger, 1974) and short calyx lobes (Southall & Hardin, 1974; Ebinger, 1974). Although the interpretation of the geographical distribution of these three taxa has varied (see Table 1), a careful study of available herbarium specimens revealed that the plants fitting the general pattern of *K. ericoides* are

limited to Pinar del Río, while individuals agreeing with the descriptions of *K. aggregata* or *K. simulata* occur only on the Isle of Pines.

The range of variation and geographical correlation of the above mentioned characters (along with several additional characters) were surveyed through a study of herbarium specimens from throughout the range of this group. The results of this investigation are summarized in Table 2 and in the taxa descriptions.

The overall diversity in the Cuban taxa of *Kalmia* is comparable to that exhibited by many North American species of the genus (see Ebinger, 1974). The three described Cuban species differ only in a few indumentum characters, slight (and not too consistent!) differences in leaf and calyx lobe length, and inflorescence structure. Thus

Table 2. **Variation in selected morphological characters within the Cuban taxa of *Kalmia*.** (LC = long-celled hairs; GH = glandular-headed hairs)

character	"ericoides" variant	"simulata" variant	"aggregata" variant
unicellular hairs on stem	lacking or very sparse	± dense	± dense
multicellular hairs on stem	scattered GH; moderate to dense LC	scattered GH; sometimes a few LC	scattered to dense GH; often scattered LC
number of lvs. per cm on stem	ca. 4–25	ca. 10–25	ca. 9–25
unicellular hairs on adaxial leaf surface	lacking to sparse along midvein	lacking to sparse along midvein	moderate to dense (occasionally only sparse)
multicellular hairs on adaxial leaf surface	scattered GH and LC	scattered GH, sometimes also LC	scattered to dense GH, sometimes also LC
leaf length	(3–) 4–9 mm	(3–) 3.5–8.5 mm	5–14 mm
inflorescence	lax	lax	lax to compact
unicellular hairs on pedicels	lacking	sparse to dense	dense
unicellular hairs on abaxial surface of calyx lobes	lacking or with a few near apex or margin	moderate to dense throughout	dense throughout
calyx length	3–5 mm	3–4.5 mm	(3–) 4–6 mm
filaments	pubescent	pubescent	pubescent

all the Cuban populations of *Kalmia* are here considered as a single species: *Kalmia ericoides*. Within this assemblage the plants of the Isle of Pines were found to differ consistently from those of western Cuba in that their young stems are \pm densely covered with unicellular hairs (vs. lacking to very sparsely covered with such hairs). Slight, but fairly consistent, differences in indumentum were also found on the pedicels, calyx lobes, and adaxial leaf surfaces (see key). *Kalmia ericoides sensu lato* thus is considered here to be composed of two geographical varieties—the first, var. *ericoides*, endemic to Pinar del Río, and the second, var. *aggregata*, endemic to the Isle of Pines. *Kalmia simulata* is included within *K. ericoides* var. *aggregata* because no combination of characters will unambiguously separate these two supposed taxa—all characters show extensive overlap (Table 2). The leaves of these Isle of Pines plants may lack unicellular hairs on the adaxial surface, be slightly pubescent along the midvein, slightly or moderately pubescent throughout, or densely pubescent; the multicellular pubescence varies from a sparse to dense covering of long to short-stalked glandular-headed hairs, sometimes with a few long-celled hairs intermixed. No morphological gap exists between the often nearly glabrous “*simulata*” variant and the densely unicellular-pubescent “*aggregata*” variant (see especially Killip 45385 and Ekman 12492). In fact, both forms have been collected at the same locality (see Killip 42882, Léon & Marie-Victorin 17852, 17853, 18857, Marie-Victorin & Alain 77, 77a, all from Los Indios), and sometimes even mixed together on the same herbarium sheet. Clearly the *Kalmia* populations of this island (or at least the Los Indios area) are variable in leaf pubescence. Continuous variation in leaf length, internode length, compactness of inflorescence, and calyx length is also present.

Ebinger (1974) considered *Kalmia simulata* to be a synonym of *Kalmia ericoides* var. *ericoides* based upon characters of indumentum, leaf and calyx lobe length, and compactness of the inflorescence. However, as indicated in Table 2 (and in discussion above) these characters do not support Ebinger's placement of these plants. Thus the basic dichotomy within the Cuban *Kalmias* is between those populations of Pinar del Río which have young stems essentially lacking unicellular hairs but with a moderate to dense covering of long-celled hairs and scattered glandular-headed hairs, and those of the Isle of Pines which have stems with a \pm dense covering of unicellular hairs along with a sparse to dense covering of short to

long-stalked glandular-headed hairs and often a few long-celled hairs. A single plant (*Marie-Victorin & Alain 77a*) from the Isle of Pines completely lacks unicellular hairs on the young twigs. However, this plant grew together with densely pubescent plants (see *Marie-Victorin & Alain 77*) and can be identified by its leaf indumentum.

Keys and descriptions of the Cuban taxa of *Kalmia* follow.

Kalmia ericoides Wright ex Griseb. Cat. Pl. Cubensium **51**. 1866.

An evergreen erect to decumbent-spreading, sparsely branched shrub to 1 (–1.4) m tall with a thickened or burl-like stem just below soil surface; frequently sprouting from base after fire or disturbance. Bark of larger branches dark brown and longitudinally furrowed. Twigs terete, light gray to reddish, slender to stout, densely covered with unicellular hairs to lacking such hairs, sparsely to densely covered with multicellular, multiseriate, short- to long-stalked glandular-headed hairs, and lacking to densely covered with multicellular, multiseriate, long-celled hairs. Buds minute, to 0.3 mm long, densely covered with glandular-headed and long-celled hairs. Leaves alternate and sparsely to densely distributed along stem (ca. 4–25 (–30) leaves per cm); blade linear to ovate, (3–) 3.5–14 mm long, 0.5–3 (–4) mm wide, coriaceous; apex acute; base cuneate to rounded; margin strongly revolute; adaxial surface densely covered with unicellular hairs to lacking such hairs, very sparsely to densely covered with short- to long-stalked glandular-headed hairs, and lacking to sparsely covered with long-celled hairs; abaxial surface sparsely to densely covered with unicellular hairs, occasionally such hairs completely lacking, with scattered short- to long-stalked glandular-headed hairs and sometimes long-celled hairs; petiole essentially lacking to 1.5 mm long with a unifacial vascular bundle. Flowers 5-merous, solitary (or occasionally in fascicles or short racemes), in the axils of leaves or bract-like leaves at ends of branches, thus forming a pseudoterminal cluster. Pedicels 4–14 mm long, densely covered with unicellular hairs to lacking such hairs, with scattered glandular-headed hairs and sometimes also long-celled hairs; bracteoles two, opposite and basal, ovate-triangular to narrowly triangular, 1–3 mm long, with unicellular hairs and glandular-headed hairs. Calyx lobes narrowly triangular to ovate-triangular, 3–6 mm long, 0.8–2.3 mm wide, green, with slightly

acuminate to acute apices, tardily deciduous in fruit; adaxial surface densely covered with unicellular hairs to lacking such hairs, with or without scattered glandular-headed and/or long-celled hairs; abaxial surface with a few unicellular hairs near apex to densely covered with such hairs, with scattered glandular-headed hairs, sometimes also long-celled hairs. Corolla with a short cylindrical tube extending into a shallowly lobed and rotate limb, with saccate depressions in which the anthers are held under tension, 6–12 mm long, 8–17 mm wide, white to pink; adaxial surface sparsely covered with unicellular hairs toward base (tubular portion); abaxial surface with glandular-headed and sometimes also long-celled hairs, occasionally

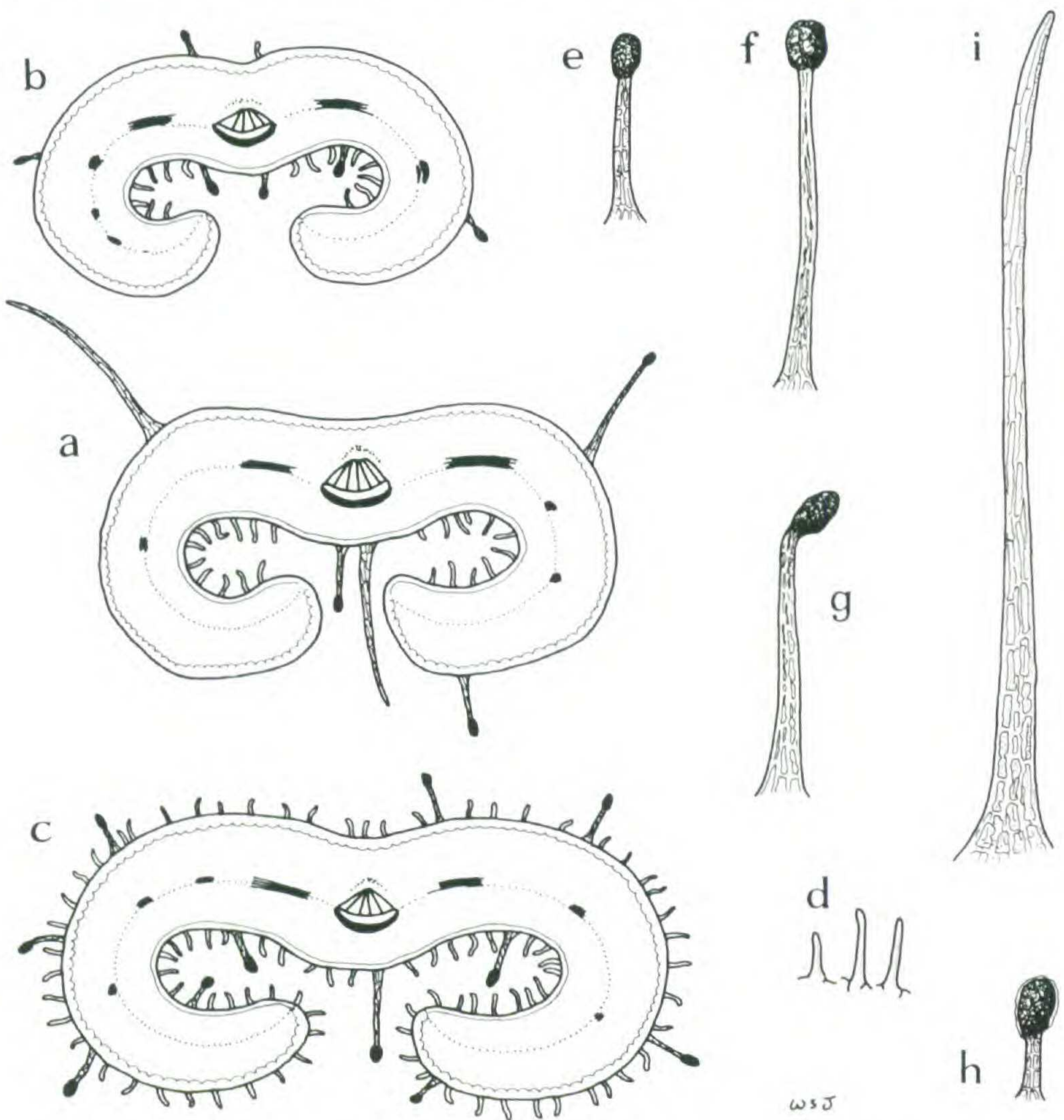


Figure 1. Pubescence of *Kalmia ericoides*. **a–c**, Cross-sections of leaves, $\times 25$: **a**, *K. ericoides* var. *ericoides*. **b**, *K. ericoides* var. *aggregata*, "glabrous" extreme. **c**, *K. ericoides* var. *aggregata*, pubescent extreme. **d–i**, Hairs (adaxial leaf surface), $\times 75$: **d**, unicellular hairs. **e–h**, glandular-headed hairs. **i**, long-celled hair.

also with a few unicellular hairs. Filaments sparsely to moderately covered with unicellular hairs near base and glabrous above, 3–5 mm long; anthers ovoid, 0.7–1.2 mm long, opening by large, \pm terminal, slit-like pores; pollen released in tetrads with viscid strands. Ovary with axile placentation and centrally located, bilobed placentae; style 3.5–7 mm long. Fruit a septicidal capsule, subglobose to ovoid, 1.7–3 mm long, 2–4 mm wide, sparsely to densely covered with glandular-headed hairs, sometimes also with a few unicellular hairs. Seeds brown, ovoid, 0.4–0.7 mm long, the testa of slightly elongated and minutely pitted cells, not extending past the ends of the seed; embryo minute.

KEY TO VARIETIES

1. Stems lacking unicellular hairs to very sparsely unicellular-pubescent; pedicels lacking unicellular hairs; abaxial surface of calyx lobes lacking unicellular hairs or with only a few near apex or along margin; adaxial surface of leaves lacking unicellular hairs to sparsely covered with such hairs along mid-vein; [Pinar del Río] var. *ericoides*
1. Stems \pm densely covered with unicellular hairs; pedicels very sparsely to densely covered with unicellular hairs; abaxial surface of calyx lobes moderately to densely covered with unicellular hairs throughout; adaxial surface of leaves lacking unicellular hairs to densely covered with such hairs; [Isle of Pines] var. *aggregata*

Kalmia ericoides* Wright ex Griseb. var. *ericoides

Chamaedaphne ericoides (Wright ex Griseb.) Kuntze, Rev. Gen. Pl. 2: 388. 1891. *Kalmiella ericoides* (Wright ex Griseb.) Small, North Amer. Fl. 29: 54. 1914. TYPE: Cuba, Pinar del Río: Guane, near La Grifa, *C. Wright 2199* (HOLOTYPE: GOET, not seen; ISOTYPES: GH, MO!, NY (3 sheets)!, US).

Stems lacking unicellular hairs or very sparsely covered with such hairs, with a moderate to dense covering of long-celled hairs and glandular-headed hairs. Leaves (3–) 4–9 mm long, 0.5–1.7 (–3) mm wide; adaxial surface lacking unicellular hairs or only sparsely covered with such hairs on mid-vein (especially near base), with scattered glandular-headed hairs and conspicuous, long-celled hairs (especially along margin near base). Pedicels lacking unicellular hairs, usually longer than subtending leaves, thus giving inflorescence an open appearance. Calyx lobes 3–5 mm long; abaxial sur-

face with a few unicellular hairs near apex and along margin, with scattered glandular-headed and long-celled hairs. Capsules lacking unicellular hairs. (Figure 1; see also Southall & Hardin, 1974).

inflorescence a compact to open appearance. Calyx lobes 3–6 mm long; abaxial surface moderately to densely (or occasionally only sparsely) covered with unicellular hairs throughout, with a sparse to dense covering of glandular-headed hairs, often also with long-celled hairs. Capsule with or without unicellular hairs. (Figure 1; see also Jennings, 1917; Marie-Victorin & Léon, 1944; Roig & Acuña, 1957; Southall & Hardin, 1974.)

DISTRIBUTION AND ECOLOGY. Cuba, Isle of Pines (Figure 2), in whitesand savannas and pinelands (dominants: *Pinus tropicalis*, *P. caribaea*, *Colpothrinax wrightii*, and *Acoelorrhapha wrightii*); for detailed discussion of vegetation along with lists of characteristic species see Jennings (1917), Marie-Victorin & Léon (1944), Alain (1946). Flowering from November through May.

DISTRIBUTION AND ECOLOGY. Cuba, prov. Pinar del Río (Figure 2), in white-sand savannas; associated species briefly discussed by Marie-Victorin & Léon (1944). Flowering from November through May (June).

REPRESENTATIVE SPECIMENS: Cuba, prov. Pinar del Río. Sabanalamar, El Sábalo, *Bro. Alain 1326* (GH, US); Arroyo Mantua, Damuji, near Rincon del Prado, *Ekman 11024* (NY); La Grifa, Laguna Larga, *Ekman 18165* (NY, US); Laguna de Alcatraz Grande, Remates de Guane, *Bros. Léon & Marie-Victorin 18706* (GH, US).

***Kalmia ericoides* Wright ex Griseb. var. *aggregata* (Small) Ebinger, *Rhodora* 76: 389. 1974.**

Kalmiella aggregata Small, North Amer. Fl. 29: 54. 1914. *Kalmia aggregata* (Small) Copeland, Amer. Midl. Nat. 30: 571. 1943. TYPE: Cuba, Isle of Pines: Los Indios, 17 May 1910, *Jennings 324* (HOLOTYPE: NY!; ISOTYPE: MO!).

Kalmiella simulata Britton & Wilson, Mem. Torrey Bot. Club 16: 93. 1920. *Kalmia simulata* (Britton & Wilson) Southall, Jour. Elisha Mitchell Sci. Soc. 90: 22. 1974. TYPE: Cuba, Isle of Pines, vicinity of Los Indios, 13 Feb. 1916, *Britton, Britton & Wilson 14205* (HOLOTYPE: NY!).

Stem \pm densely covered with unicellular hairs, with sparse to dense covering of glandular-headed hairs and often with long-celled hairs. Leaves (3–) 3.5–14 mm long, 0.5–3 (–4) mm wide; adaxial

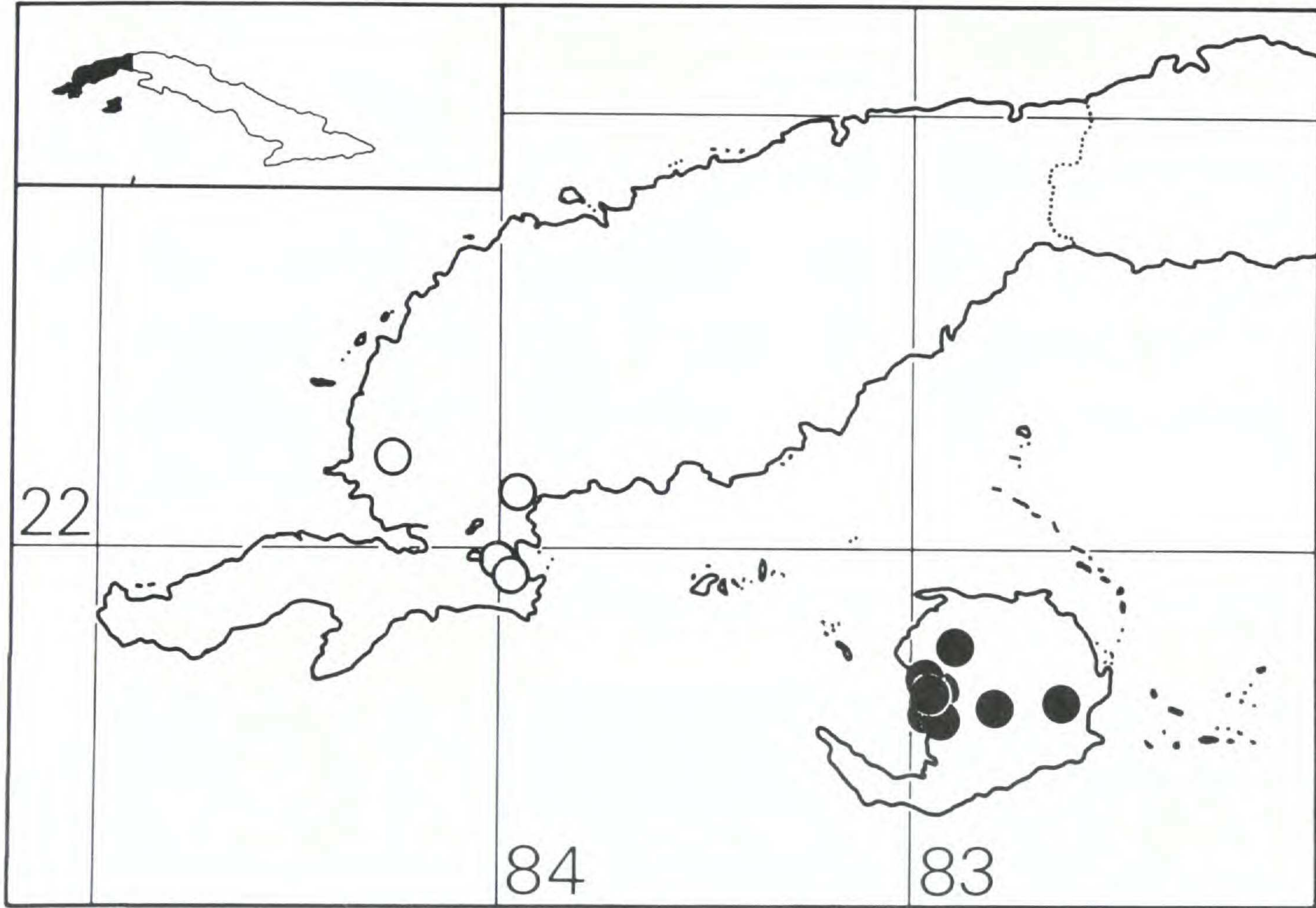


Figure 2. Distribution of *Kalmia ericoides* var. *ericoides* (circles) and *K. ericoides* var. *aggregata* (dots).

surface lacking to densely covered with unicellular hairs throughout, with sparse to dense covering of glandular-headed hairs and sometimes a few long-celled hairs. Pedicels very sparsely to densely covered with unicellular hairs, variable in length, thus giving the

REPRESENTATIVE SPECIMENS: Cuba, Isle of Pines: San Pedro, *Britton, Britton & Wilson 14146* (F, GH, MO, NY, US); Santa Bárbara, Westport, *Ekman 12096* (NY); Loma Dagnillo, *Ekman 12492* (NY); Los Indios, *Killip 42882* (F, GH, NY, US); Playa Roja, *Killip 43001* (GH, NY, US); between Mina de Oro and Playa del Soldado, *Killip 45385* (GH); Los Indios, *Bros. Léon & Marie-Victorin 17852* (GH, US), *17853* (GH), *18857* (GH, US); Los Indios, *Bros. Marie-Victorin & Alain 77* (GH, NY, US), *77a* (US).

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